101. 10101011000100100011010001010110 1
102. 10101011000100100011010001010111 0
103. 10101011000100100011010001010110 0
104. 10101011000100100011010001010100 0
105. 10101011000100100011010001011000 0
106. 10101011000100100011010001010000 0
107. 10101011000100100011010001100000 0
108. 10101011000100100011010001000000 0
109. 10101011000100100011010010000000 0
110. 10101011000100100011010100000000 0
111. 10101011000100100011011000000000 0
112. 10101011000100100011010000000000 0
113. 10101011000100100011100000000000 0
114. 10101011000100100011000000000000 0
115. 10101011000100100010000000000000 0
116. 10101011000100100100000000000000 0
117. 10101011000100101000000000000000 0
118. 10101011000100110000000000000000 0
119. 10101011000100100000000000000000 0
120. 10101011000101000000000000000000 0
121. 10101011000110000000000000000000 0
122. 10101011000100000000000000000000 0
123. 10101011001000000000000000000000 0
124. 10101011010000000000000000000000 0
125. 10101011100000000000000000000000 0
126. 10101011000000000000000000000000 0
127. 10101010000000000000000000000000 0
128. 10101100000000000000000000000000 0
129. 10101000000000000000000000000000 0
130. 10110000000000000000000000000000 0
131. 10100000000000000000000000000000 0
132. 11000000000000000000000000000000 0

Figure 1 (Prior Art)

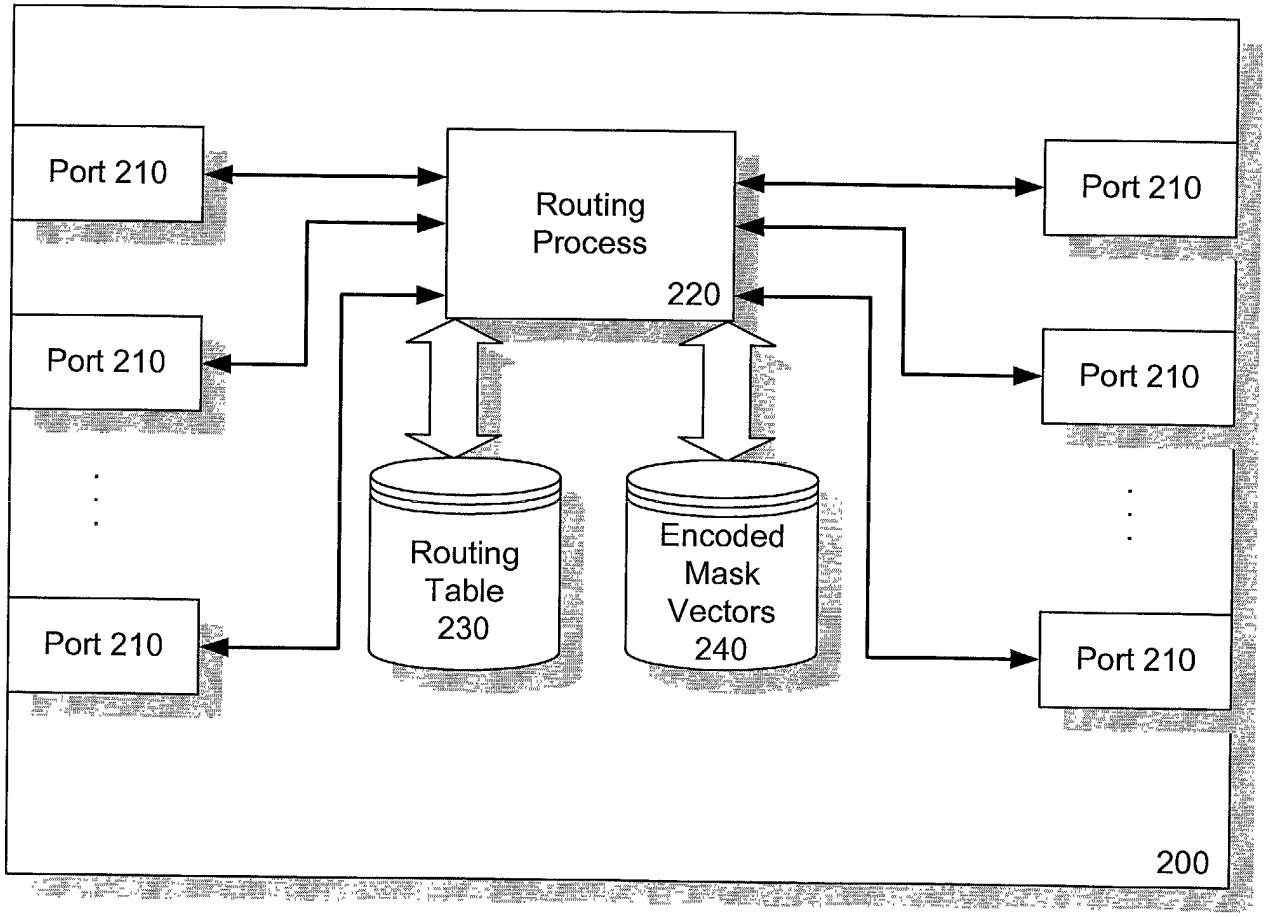
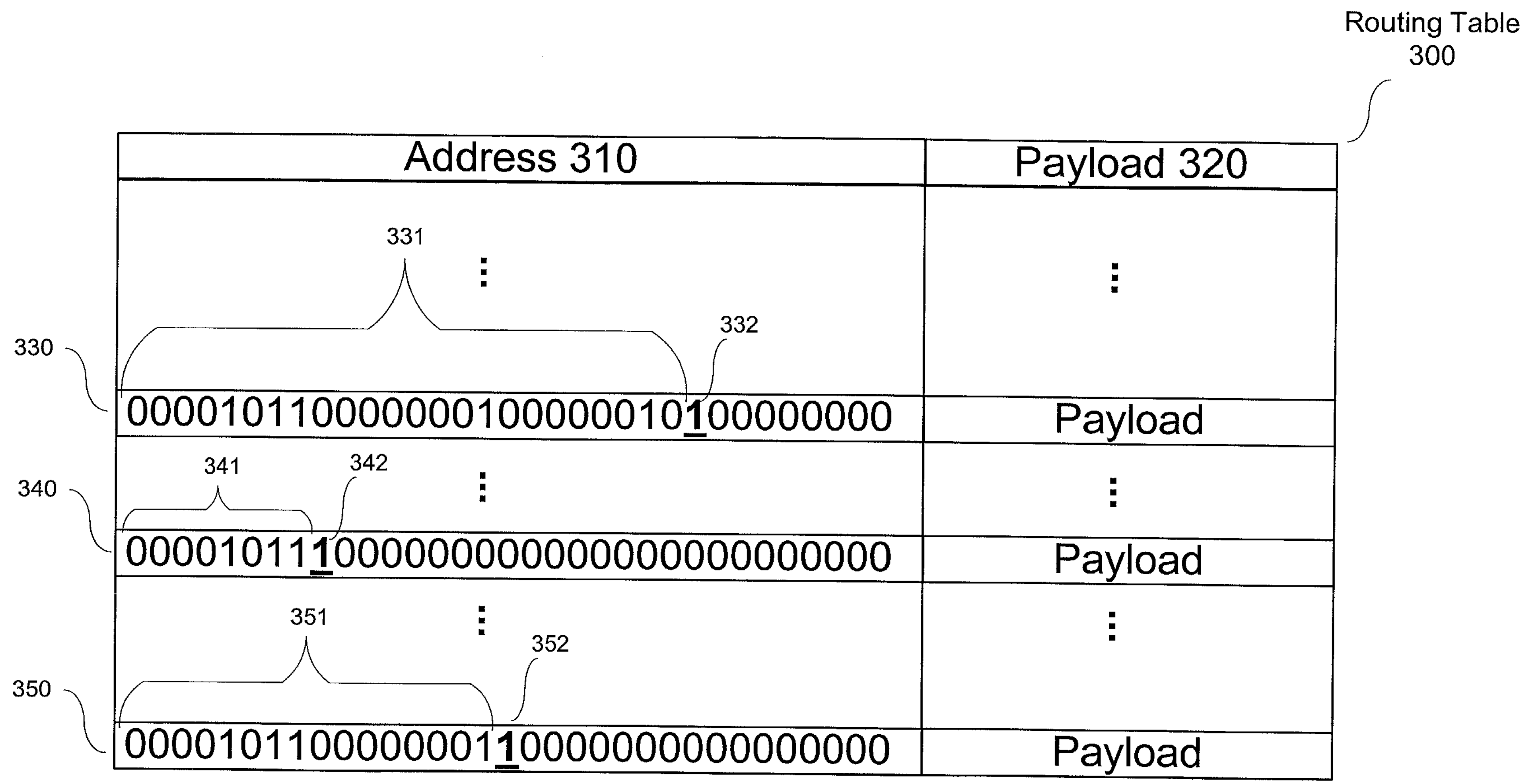

Port 210
Port 210
Port 210
Routing Process
220
Routing Table 230
Encoded Mask Vectors 240
Port 210
Port 210
Port 210
200

Figure 2



Routing Table
300
Address 310
Payload 320
331
332
330
00001011000000010000001010000000
Payload
341
342
340
00001011100000000000000000000000
Payload
351
352
350
00001011000000011000000000000000
Payload

Figure 3

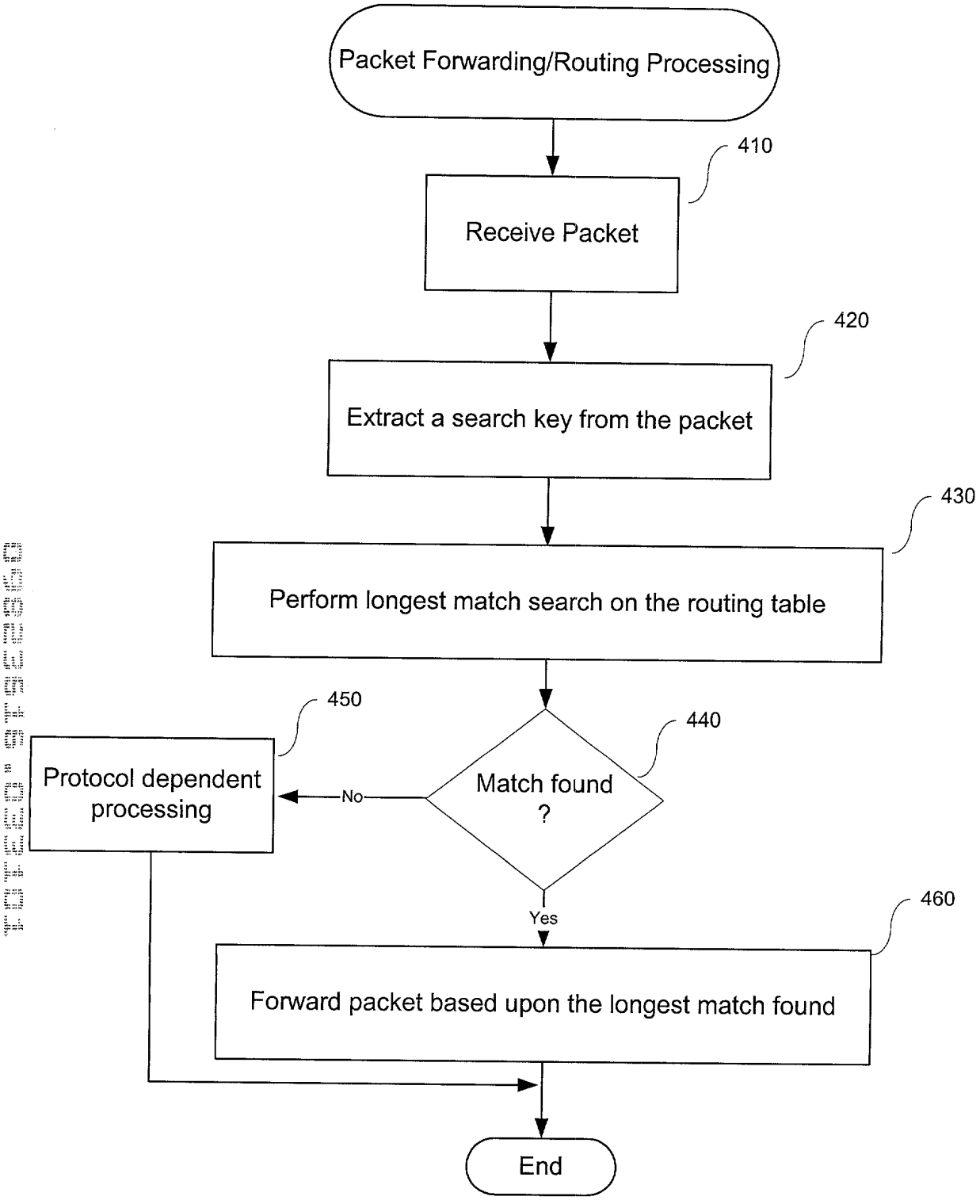

Packet Forwarding/Routing Processing
410
Receive Packet
420
Extract a search key from the packet
430
Perform longest match search on the routing table
450
Protocol dependent processing
No
440
Match found ?
Yes
460
Forward packet based upon the longest match found
End

Figure 4

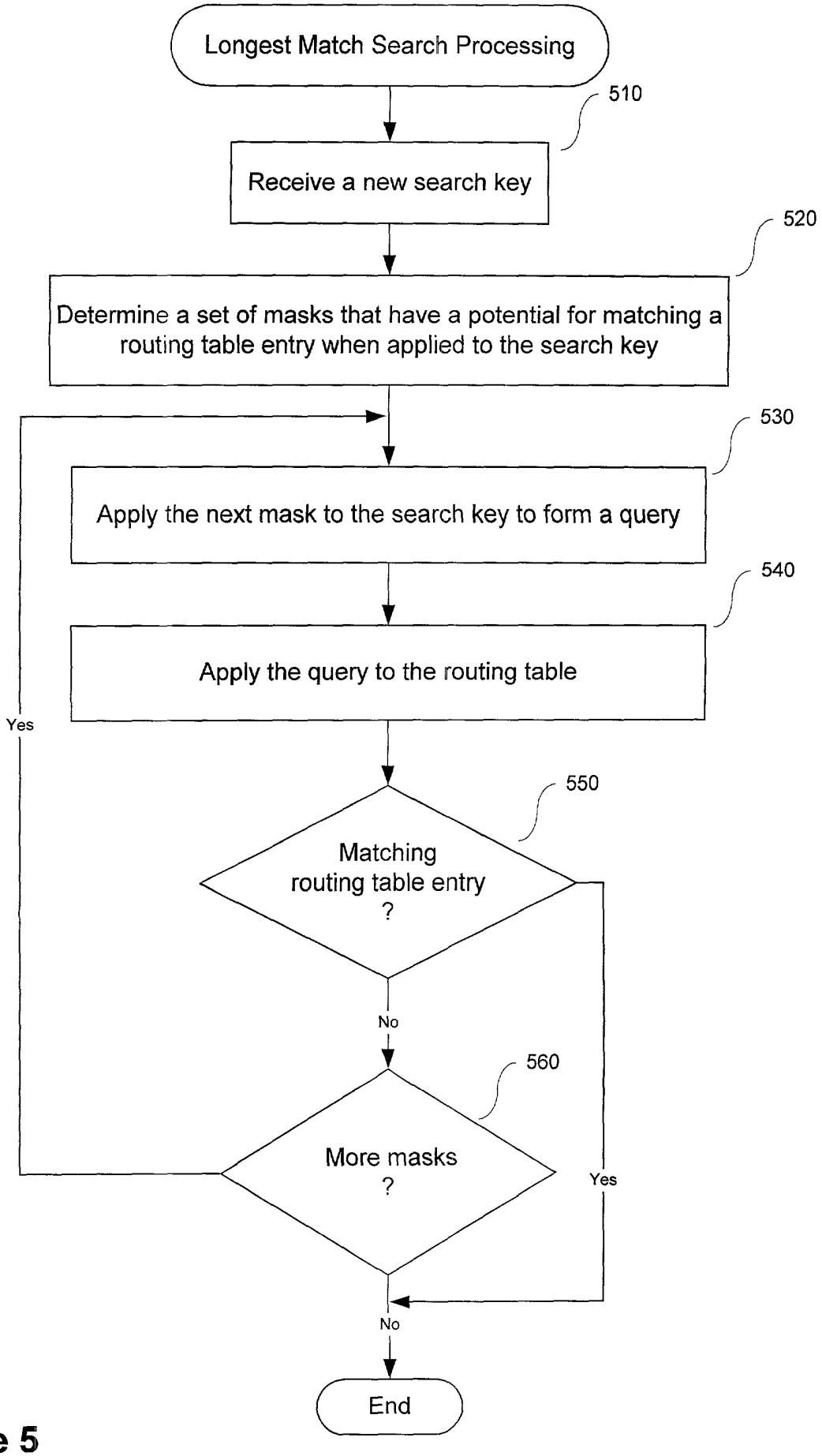

Longest Match Search Processing
510
Receive a new search key
520
Determine a set of masks that have a potential for matching a routing table entry when applied to the search key
530
Apply the next mask to the search key to form a query
540
Apply the query to the routing table
550
Matching routing table entry ?
Yes
No
560
More masks ?
Yes
No
End

Figure 5

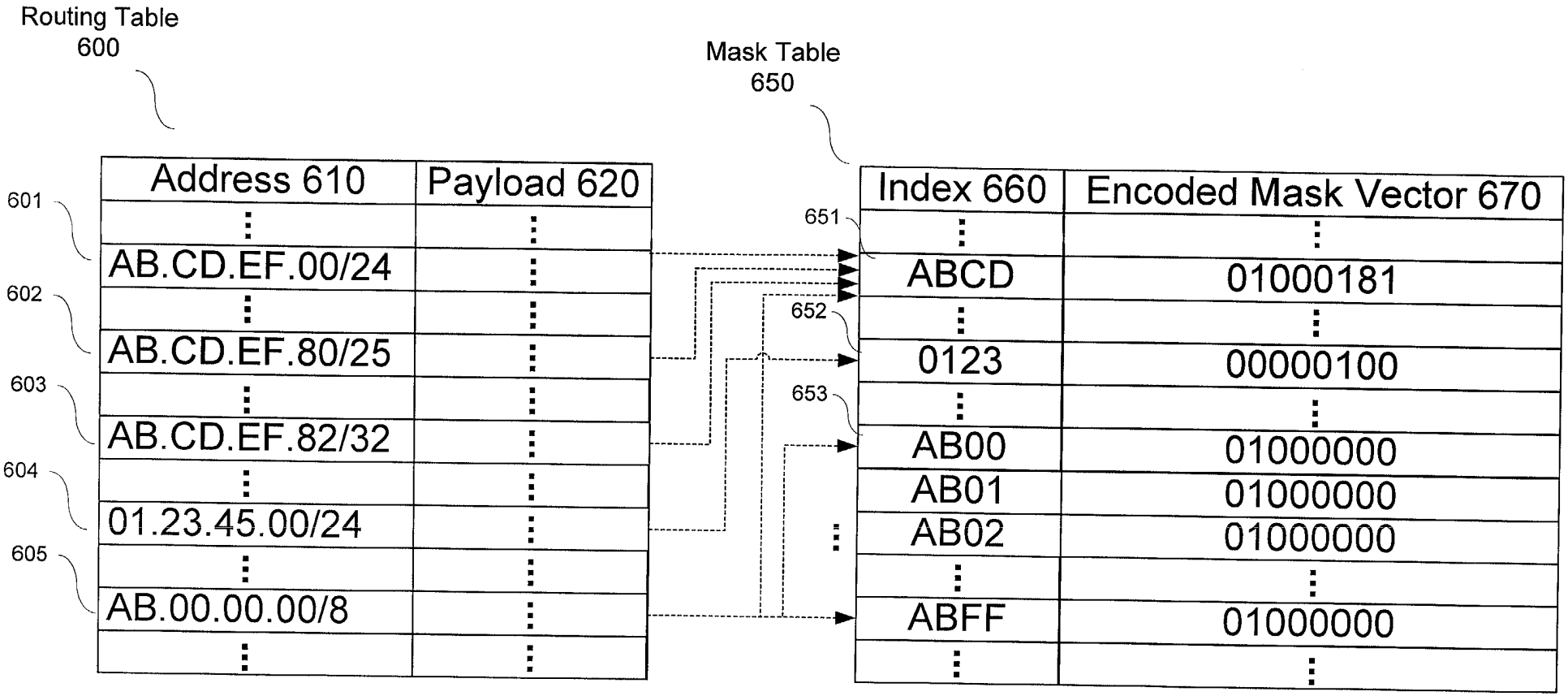

Routing Table
600
Mask Table
650
Address 610
Payload 620
601
AB.CD.EF.00/24
602
AB.CD.EF.80/25
603
AB.CD.EF.82/32
604
01.23.45.00/24
605
AB.00.00.00/8
Index 660
Encoded Mask Vector 670
651
ABCD
01000181
652
0123
00000100
653
AB00
01000000
AB01
01000000
AB02
01000000
ABFF
01000000

Figure 6

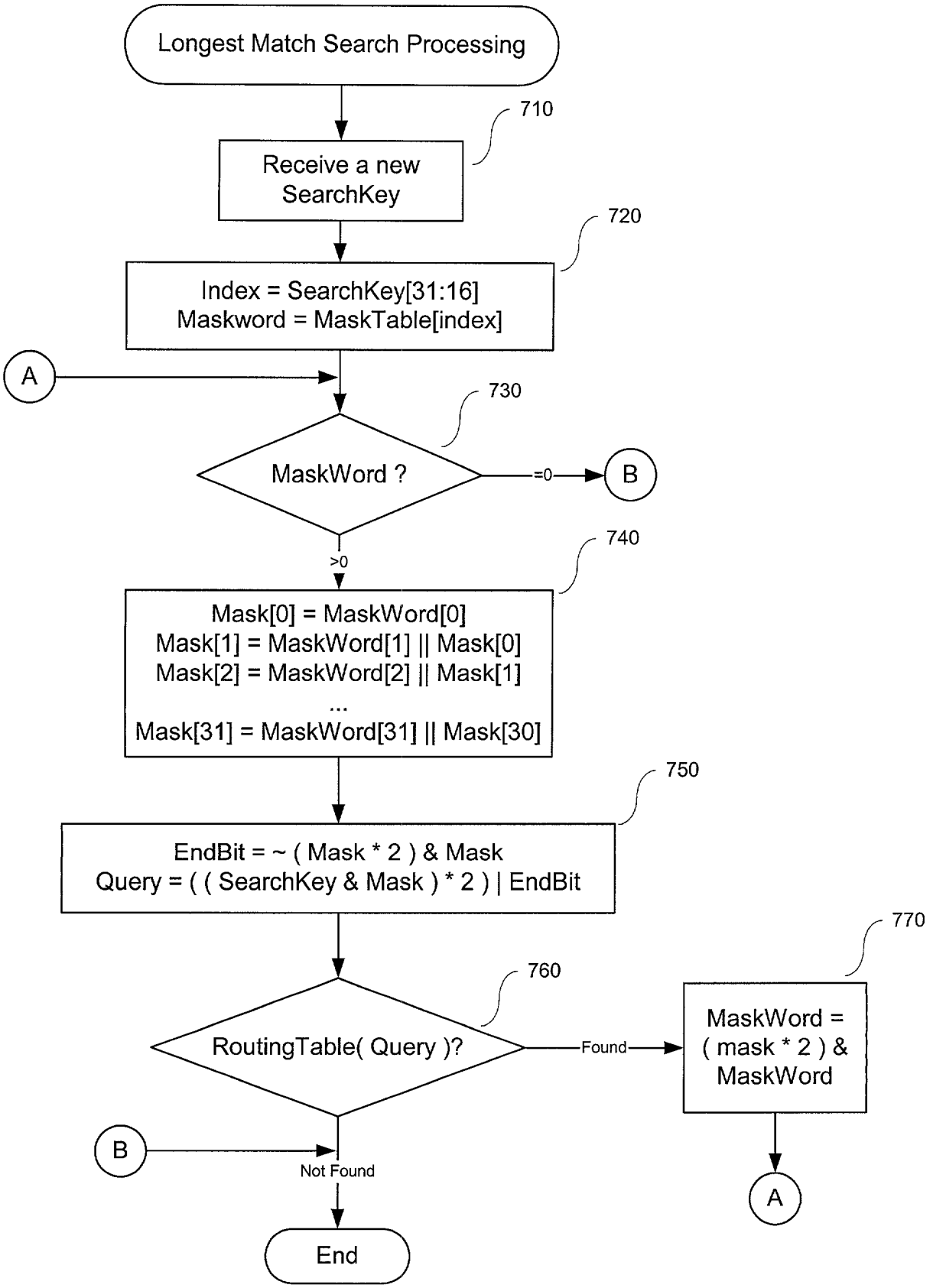

Longest Match Search Processing
710
Receive a new SearchKey
720
Index = SearchKey[31:16]
Maskword = MaskTable[index]
A
730
MaskWord ?
=0
B
>0
740
Mask[0] = MaskWord[0]
Mask[1] = MaskWord[1] || Mask[0]
Mask[2] = MaskWord[2] || Mask[1]
...
Mask[31] = MaskWord[31] || Mask[30]
750
EndBit = ~ (Mask * 2) & Mask
Query = ((SearchKey & Mask) * 2) | EndBit
760
RoutingTable(Query)?
Found
770
MaskWord = (mask * 2) & MaskWord
A
B
Not Found
End

Figure 7

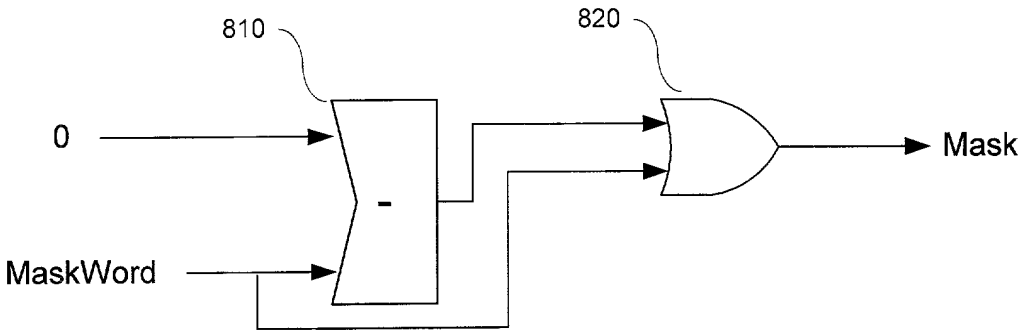


Figure 8

910	MaskWord	0001000100010000
920	0 - MaskWord	1110111011110000
930	Mask	1111111111110000

Figure 9

910	MaskWord	0001000100010000
930	Mask	1111111111110000
1010	Mask * 2	1111111111100000
1020	New MaskWord	0001000100000000

Figure 10